Geometry Notes

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MATH

Length of a line segment

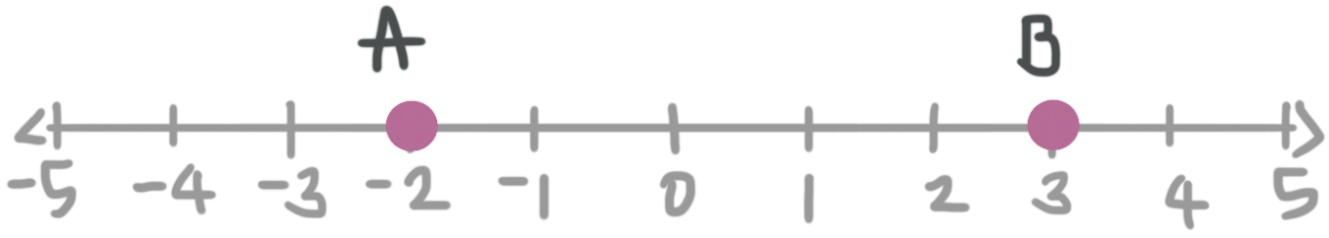
In this lesson we'll look at how to find the length of a line segment algebraically when we're given information and measurements about parts of the line segment.

Line segment

A line segment is a piece of a line that connects two points. The points at the end of the line segment are called endpoints. You name a line segment by using its endpoints. A drawing of a line segment has two points at the end. The symbol for a line segment is given the letter names of the endpoints with an line over the top. For example line segment $\overline{AB}$.

Line segments and distance

The distance between two points on a line segment is called the length of the segment.



In this example the distance between $\overline{AB} = |3-(-2)| = |3+2| = |5| = 5$ units. In this example, you could also count from A to B and get 5 units.

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Sometimes you might need to draw your own number line to help solve a problem.

Example

Points S, T, U, V, and W lie in order on a number line. Point U is at -2. Where are the rest of the points located?

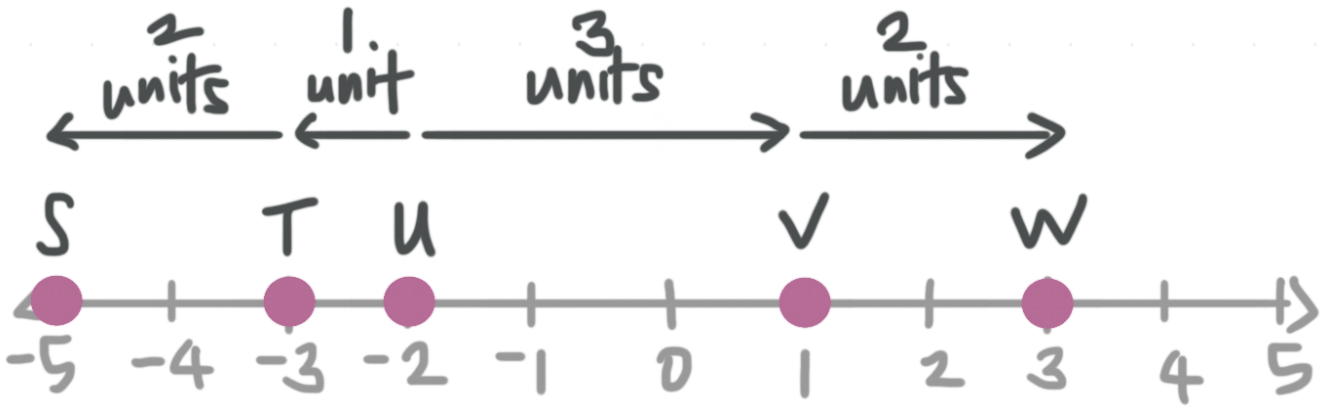
$$\overline{ST} = 2$$

$$\overline{TU} = 1$$

$$\overline{UV} = 3$$

$$\overline{VW} = 2$$

If we plot point U at -2, then S, T, U, V, and W must be plotted this way:



We know point U is on -2 and $\overline{TU} = 1$. This lets us locate point T at -3. Now we can use $\overline{ST} = 2$ to find that $S = -5$ and $\overline{UV} = 3$ to find that $V = 1$. Now we can locate point W by using $\overline{VW} = 2$, so $W = 3$.

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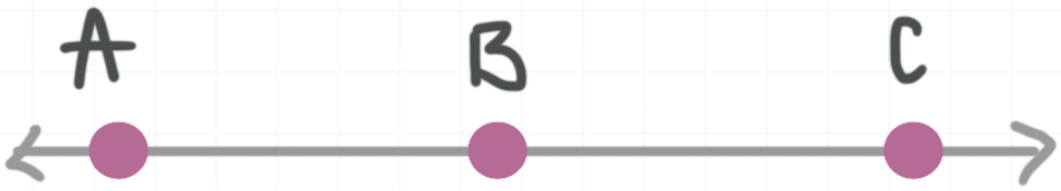
Let's look at another example.

Example

How long is $\overline{AB}$ if $\overline{AC} = 12$ units and $\overline{BC} = 7$ units?



We know that the length of $\overline{AC} = 12$ units and the length of $\overline{BC} = 7$ units. From the diagram we also know that $\overline{AB}$ is part of $\overline{AC}$.

We can see that $\overline{AC} - \overline{BC} = \overline{AB}$, so we have $\overline{AB} = 12 - 7 = 5$ units.

Let's look at one last example.

Example

There are four points on a number line. What is $\overline{AB} + \overline{CD}$?

$A = 2$

$B = 4$

$C = -3$

$D = -6$

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You can make a sketch to help solve the problem.

Now we can see that $\overline{AB} = |4 - 2| = 2$ units and $\overline{CD} = |-3 - (-6)| = 3$ units.

So $\overline{AB} + \overline{CD} = 2 + 3 = 5$ units.

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